

## Article

# Emotional self-efficacy, conduct problems, and academic attainment: Developmental cascade effects in early adolescence

Wigglesworth, M, Qualter, Pamela and Humphrey, N

Available at <http://clok.uclan.ac.uk/14911/>

*Wigglesworth, M, Qualter, Pamela and Humphrey, N (2017) Emotional self-efficacy, conduct problems, and academic attainment: Developmental cascade effects in early adolescence. The European Journal of Developmental Psychology, 14 (2). pp. 172-189. ISSN 1740-5629*

It is advisable to refer to the publisher's version if you intend to cite from the work.  
<http://dx.doi.org/10.1080/17405629.2016.1180971>

For more information about UCLan's research in this area go to  
<http://www.uclan.ac.uk/researchgroups/> and search for <name of research Group>.

For information about Research generally at UCLan please go to  
<http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the [policies](#) page.

1

2 **Emotional self-efficacy, conduct problems, and academic attainment:**

3 **Developmental cascade effects in early adolescence**

4

5 **Michael Wigelsworth<sup>1</sup>, Pamela Qualter<sup>2</sup>, & Neil Humphrey<sup>1</sup>**

6 **1. Manchester Institute of Education, University of Manchester,**

7 **Manchester, UK**

8 **2. School of Psychology, University of Central Lancashire, Preston, UK**

9

10 **Other:** M.,Wigelsworth, P., Qualter, and N., Humphrey (2016): Emotional  
11 self-efficacy, conduct problems, and academic attainment: Developmental  
12 cascade effects in early adolescence. European Journal of Developmental  
13 Psychology, DOI: 10.1080/17405629.2016.1180971

14

15 It is advisable to refer to the publisher's version if you intend to cite from the  
16 work. To link to this article, please go to the following URL:

17 <http://dx.doi.org/10.1080/17405629.2016.1180971>

18

19

## **Abstract**

The study is amongst the first of its kind to utilise developmental cascade modelling in order to examine the inter-relations between emotional self-efficacy, conduct problems, and attainment in a large, nationally representative sample of English adolescents ( $n = 2,414$ , aged 11 years). Using a 3-wave, longitudinal, cross lagged-design, we tested three cascading hypotheses: adjustment erosion, adjustment fortification, and academic incompetence. A fourth hypothesis considered the role of shared risk. Results supported small effects consistent with the cascade hypotheses, and a small but significant effect was found for shared risk. Strengths and limits of the study are considered alongside a discussion of the implications for these findings.

Keywords: emotional self-efficacy; conduct problems; attainment; developmental cascade

## **Introduction**

Developmental cascades are, “the cumulative consequences for development of the many interactions and transactions occurring in developing systems that result in spreading effects across different levels, among domains at the same level, and across different systems or generations” (Masten & Cicchetti, 2010, p.491). Drawing on ecological and developmental systems theories (e.g. Bronfenbrenner, 2005; Lerner & Castellino, 2002), the body of work in this area predicts that functioning in different domains, levels, or systems are developmentally related. Namely, successful accomplishment of developmental tasks in a given domain provides a scaffold for later functioning in the same and other domains; equally, failures in these tasks can trigger negative cascade effects. In this paper we use a developmental cascade model to examine longitudinal inter-relationships between emotional self-efficacy, behaviour problems, and academic attainment in early adolescence. The model is used to test three key hypotheses in the study of developmental cascades – adjustment erosion, academic competence, and shared risk (Moilanen, Shaw, & Maxwell, 2010) – and a fourth prediction drawing on the positive youth development perspective (Lewin-Bizan, Bowers, & Lerner, 2010), which we term ‘adjustment fortification’.

## **Developmental cascades in adolescence**

Our focus on adolescence is driven by the fact that this period is marked by major physical, psychological, behavioural, and contextual changes, including the onset of puberty, the transition to secondary school, and substantial neurological reorganisation (Coleman, 2011). Adolescence is a captivating, critical life stage that has important repercussions for later life (Hagell, Coleman & Brooks, 2013). This is particularly true of the domains of functioning that we examine in the current study. For example, we know that up to 50% of adult mental health problems have their first onset in adolescence (Belfer, 2008). Similarly, academic competence in adolescence predicts future academic success and transition to the workplace (Ek, Sovio, Remes & Jarvelin, 2005). What is less known currently is the nature of inter-relationships between these domains during this important period. We also know relatively little about the potential role played by adolescents' emotional self-efficacy in interrupting symptom-driven pathways and promoting positive adjustment.

Extant research on developmental cascades typically tests one or more of three key hypotheses. First, the *adjustment erosion* model predicts that mental health problems lead to later academic difficulties (Moilanen et al., 2010). For example, aggressive and disruptive behaviour can undermine academic progress because of its effect on relationships with school staff and peer acceptance. This is particularly salient in early adolescence because of the increased emphasis on academic ability and reduced tolerance for disruption seen in secondary education (Humphrey & Ainscow, 2006). Research by Moilanen et al (2010) offers support for this hypothesis, with high

88 levels of externalising difficulties in middle childhood predicting low academic  
89 competence in early adolescence. Second, the *academic incompetence*  
90 model suggests that difficulties relating to academic competence can trigger  
91 or exacerbate mental health problems (Moilanen et al., 2010). Youth who are  
92 less academically able may experience considerable frustration and  
93 disaffection that eventually manifests as aggressive and disruptive behaviour.  
94 As above, this is a particularly critical consideration in adolescence given the  
95 increasingly high stakes nature of academic assessments in secondary  
96 education. By way of illustration, Vaillancourt, Brittain, McDougall, and Duku's  
97 (2013) recent study evidenced clear cascade effects of low academic grade  
98 point average on later externalising behaviour problems in the late childhood-  
99 early adolescence period. Finally, the *shared risk* model stipulates that  
100 cascade effects such as those outlined above are a function of other variables  
101 that affect multiple domains of development more generally. For instance,  
102 economic disadvantage (often categorised in education research as eligibility  
103 for free school meals (Gorard, 2012)) is a well-known risk factor for lower  
104 academic attainment (Department for Education, 2015) and higher social-  
105 emotional difficulties (Bradley & Corwyn, 2002). This has been attributed to a  
106 number of factors including a lack of ease or unwillingness to access  
107 resources and associated parental beliefs and behaviours around education  
108 (Davis-Kean, 2005). Also, research consistently demonstrates that being  
109 identified as having special educational needs (an expansive term in education,  
110 denoting particular needs or disabilities beyond a school's resource  
111 capabilities) puts a child at risk of experiencing significantly worse academic  
112 and psychosocial outcomes through the course of schooling (e.g. Department

for Education, 2013, Van Cleave & Davis, 2006). This is attributable to a number of causes, including an over-representation as victims of bullying (Monchy et al., 2004; Van Cleave & Davis, 2006) and poor social relationships (Frostad & Pijl, 2007, Pijl et al., 2008; Valäs, 1999). These outcomes are, of course, deeply inter-related (Frederickson & Furnham, 2004; Kaukiainen et al., 2002). However, these factors have not been fully explored within a developmental cascades framework. Deighton et al.'s (under review) recent study provides some confirmatory evidence, demonstrating that pathways from academic attainment to later internalising and externalising problems were rendered insignificant once socio-economic and disability status was taken into account in their late childhood sample, warranting further investigation.

The aim of the current study was to extend understanding of developmental cascade processes by addressing several gaps, limitations, and inconsistencies in the existing evidence base. First, sample sizes are often modest (e.g.  $n = 85$  in Bornstein, Hahn, & Suwalsky, 2013b) and drawn from highly specified populations (e.g. McCarty et al.'s (2008) study of adolescent girls from low-income households). This reduces test sensitivity (Masten et al., 2005) and limits generalizability and comparability of findings (Deighton et al., under review). Hence, we drew upon a large, representative sample of adolescents. Second, most studies in this area have been carried out in North America. Transferability of findings cannot be assumed because the cultural context is a primary component of the developmental eco-system. For example, socialisation practices relating to emergent behaviour problems

can vary across countries and cultures (Chen, Huang, Chang, Wang, & Li, 2010). The current study is among the first of its kind in England. Third, following Deighton et al (under review), we took the opportunity to extend assessment of shared risk to include disability status, which has been neglected in previous research despite its associations with both academic achievement (Department for Education, 2013) and conduct problems (Green, McGinnity, Meltzer, Ford, & Goodman, 2005). Fourth, developmental cascade research has traditionally focused on symptom-driven pathways, with less attention paid to the potential fortifying effects of positive adjustment in key developmental domains (Lewin-Bizan et al., 2010). Thus, we sought to integrate a positive youth development perspective by assessing the cascade pathways emanating from and to adolescent emotional self-efficacy. Emotional self-efficacy as a positive adjustment marker carries considerable intuitive appeal; emotion regulation and social problem-solving skills are likely to influence both behaviour and learning in the school context (Qualter, Gardner, Pope, Hutchinson, & Whiteley, 2012; Qualter, Dacre-Pool, Gardner, Ashley-Kot, Wise, & Wols, 2015). Accordingly, emotional self-efficacy forms a key aspect of many non-cognitive school based interventions (Durlak, Weissberg, Dymicki, Taylor, & Schellinger, 2011; Sklad, Diekstra, Ritter, & Ben, 2012; Wigelsworth et al., in press). Both its hypothetical presence and empirical measurement have typically assumed a linear development (as proposed above), but our understanding of this relationship is incomplete with further consideration of the potential inter-relations within a cascade model. For instance, to what extent do conduct problems mediate the relationship between emotional self-efficacy and academic attainment across time?



163

164           Finally and critically, research findings pertaining to the adjustment  
165 erosion, academic incompetence and shared risk hypotheses have been  
166 inconsistent. For example, in contrast to the findings of Moilanen et al. (2010)  
167 outlined above, Romano, Babchishin, Pagani, and Kohen (2010) found no  
168 significant links between behaviour problems and later attainment. Thus, the  
169 current study confers an opportunity to provide further clarification of the  
170 nature and magnitude of developmental cascade effects.

171

## 172 **Aims and objectives**

173

174           The primary aim of the current study was to examine the longitudinal inter-  
175 relationships between emotional self-efficacy, behaviour problems and  
176 academic attainment in early adolescence. To achieve this aim, we sought to  
177 test four hypotheses, as follows:

178

- 179           1. **Adjustment erosion** – early behaviour problems will lead to later  
180 academic difficulties (H1a) and lower emotional self-efficacy (H1b).
- 181           2. **Adjustment fortification** – early emotional self-efficacy will lead to  
182 enhanced academic attainment (H2a) and reduced behaviour problems  
183 (H2b).
- 184           3. **Academic incompetence** – early academic difficulties will lead to later  
185 behaviour problems (H3a) and lower emotional self-efficacy (H3b).

186 4. **Shared risk** – cascading effects in H1-3 above are attributable to  
187 common cause risk markers, specifically socio-economic and disability  
188 status.

189  
190 In each of the above hypotheses, we examine cross-time cascading  
191 effects, whilst controlling for cross-time, within-domain stability, and within-  
192 time, cross-domain co-variance (see ‘analytical strategy’).

## 193 194 **Method**

195  
196 The study utilizes secondary analysis of data from a government-  
197 funded evaluation of a universal social-emotional learning intervention in  
198 English secondary schools (Humphrey, Lendrum, & Wigelsworth, 2010).  
199 Here we make use of a longitudinal, cross-lagged panel design with 3 annual  
200 waves of measurement – T1, T2 and T3 (T1 and T3 only for academic  
201 attainment – see below).

## 202 203 ***Participants***

204  
205 The final sample was made up single cohort of 2,414 children. All  
206 children were in their first year of secondary education (year 7, aged 11 years)  
207 at T1, drawn from 41 geographically diverse secondary schools in England.  
208 One sample *t*-tests confirmed that the study sample mirrored national norms  
209 in terms of attainment, attendance, proportion of children eligible for free  
210 school meals (FSM) (as a proxy for socio-economic status) and proportion of

children with special educational needs (SEN) (as a proxy for disability status) at the school level, and sex, ethnicity, FSM eligibility and SEN status at the child level. Study schools were shown to be slightly larger than is seen nationally.

Approximately 53.5% ( $N=1291$ ) of the study sample were female, 82.6% ( $N=1994$ ) were classified as 'White British', 9.9% ( $N=239$ ) were identified as eligible for FSM, and 12.9% ( $N=312$ ) were identified with SEN.

## **Measures**

### *Conduct problems*

Conduct problems (CP) were assessed using the relevant subscale in the self-report version of the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997). This 25-item (5 items in the CP subscale) behavioural screening measure requires respondents to endorse a series of descriptive statements (e.g. 'I get very angry and lose my temper') on a three-point scale (0 = not true, 1 = somewhat true, and 2 = certainly true). The SDQ has robust psychometric characteristics (Goodman, 2001) and is amongst the most widely used measures of its kind (Johnston & Gowers, 2005). In the current sample,  $\alpha$  ranged between .611 - .633 across each year the subscale was used. This is approximately consistent to a reported alpha value of .60 for the conduct problems subscale in a community sample of 5-15 year olds (Goodman, 2001).

### *Emotional self-efficacy*

Emotional self-efficacy (ESE) was measured using the Emotional Literacy Assessment and Intervention (ELAI) instrument (Southampton Psychology Service, 2003). This is a 25-item self-report survey that assesses emotion-related dispositions and self-perceptions, producing a single, broadband indicator. Traditionally this has been branded 'trait emotional intelligence' but ESE is an increasingly used synonym (Petrides, Furnham, & Mavroveli, 2007). Respondents endorse descriptive statements (e.g., 'I am aware of my own strengths and weaknesses') using a 25-point scale. The ELAI has acceptable psychometric properties (Southampton Psychology Service, 2003).  $\alpha$  ranged between .752-.762 across each year the scale was used.

### *Academic attainment*

Measures of academic attainment were extracted from a governmental database (the National Pupil Database – NPD) and represented compulsory academic testing at the end of Key Stages of education<sup>1</sup>. Key Stage assessments record children's attainment in the core curriculum subjects of English, Math, and Science. These were aggregated in the current study. We utilised children's Key Stage 2 (KS2) and Key Stage 3 (KS3) attainment scores, which aligned with T1 and T3 (but use different scoring scales). No

---

<sup>1</sup>

compulsory testing occurred at T2 – hence, this is absent from the panel design.

### *Shared risk*

Additional data extracted from the NPD provided indices of socio-economic and disability status. For the former, we used the Income Deprivation Affecting Children Index (IDACI). This gives the deprivation ranking of the neighbourhood in which a child lives; the score represents the proportion of children under 16 in that area who live in a low-income household. Scoring is from 0 to 1, with higher scores representing increased deprivation. For the latter, we drew on information recorded about the nature of any special educational provision made for a given child (known as Special Educational Needs – SEN), and this was used to operationalise a categorical variable as follows: (i) no additional provision (coded 0); (ii) School Action – reasonable adjustments to normal teaching practice (coded 1); (iii) School Action Plus – additional support provided by an external professional (e.g., speech and language therapist) (coded 2); and (iv) Statement of special educational need (coded 3)– a multi-professional assessment provides the foundation of a legal document outlining support needs and securing financial support for appropriate provision.

### ***Procedure***

For each wave of data collection participating schools administered paper surveys using a standardised instruction sheet. Survey completion was conducted on a whole-year or whole-class basis. School staff supported any students with literacy difficulties to enable them to access the measures. Completed measures were collected, delivered, scored and input by independent companies. The first author conducted checks on the integrity of the data to ensure accuracy of scoring. Responses were tracked through each wave of data collection and matched to NPD data through the use of a unique reference number. This information was used solely for accurate data matching and was destroyed shortly thereafter.

### ***Analytical strategy***

Tabulated pattern analysis showed that less than 1% of missing cases across all three time points were attributable to any of the socio-demographic factors included in the analysis, indicating no discernible pattern to missing data. Therefore, incomplete cases were removed on a list wise basis and analyses were conducted for all complete cases.

Cascade and shared risk effects were tested using manifest structural equation models in MPLus version 7 (Muthen & Muthen, 2012). Consistent with previous work in this area (e.g. Moilanen et al, 2010), we first tested a simple cascade model that assessed cascade pathways across domains over time while accounting for temporal stability and within-time co-variance. A second model was then constructed in which the shared risk variables were

added as predictors of each domain at each time point. These steps are diagrammed in Figure 1. In both instances, model fit was assessed using  $\chi^2$  goodness of fit, Comparative Fit Indices (CFI), the Tucker-Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA) (including 90% Confidence intervals). Model fit was considered to be acceptable if CFI and TLI were above .95, RMSEA was below .05 (Bollen & Curran, 2006) and SRMR was below .08 (Hu & Bentler, 1999).

## << FIGURE 1 >>

### **Results**

#### ***Descriptive statistics***

Table 1 presents descriptives and correlations for all of the study variables. Skew and Kurtosis were seen to be within acceptable range  $\pm 1.5$  (Tabachnick & Fidell, 2013), omitting a very minor violation for IDACI. Almost all variables were at least moderately correlated, with the highest correlations being consistent with a priori expectations (i.e., correlations of the same measure between time points).

## \*\*\* TABLE 1 \*\*\*\*

#### ***Cascades Analyses***

All pathways in the model were tested, but in the interests of clarity, only significant pathways are included in Figures 2 and 3. Given the limitations associated with significance testing (Hubbard & Lindsay, 2008), we highlight pathways with a co-efficient of at least .10 in bold; this corresponds to the oft-cited conventions for the smallest effect of interest, deemed to be, “not so small as to be trivial” (Cohen, 1992, p.156). RMSEA and TLI fell below the established thresholds for both models described in the analytical strategy. A partial explanation is offered by the combination of relatively high size of correlations in a longitudinal model over such a short time period and the large sample size. This is supported by a marginal improvement in model fit for the second model (see Figures 2 & 3), supporting the inclusion of IDACI and SEN. However, overall fit is sub-optimal, possibly suggesting the presence of exogenous variables not accounted for in the current model.

**\*\*\*FIGURE 2\*\*\***

Figure 2 shows the developmental cascade modelled to address hypotheses 1 & 2, specifically including the cross lagged pathways across all time points for emotional self-efficacy, conduct problems, and academic attainment (after accounting for temporal stability and concurrent correlations). Aside from the pathways controlling for stability across time, the largest effects were seen between T1 conduct problems predicting T2 emotional self-efficacy, and subsequent T2 emotional self-efficacy predicting T3 conduct problems. This is suggestive of a cascading relationship between these constructs. Regarding hypotheses 1 and 2, there is evidence to support the presence of both adjustment erosion and academic incompetence. Adjustment erosion is indicated by the significant pathway between T1 conduct problems and T3



academic attainment, which although significant and in the direction hypothesised (a rise in conduct problems is associated with a reduction in academic attainment), the resulting effect is comparatively small (-.030) in relation to other pathways in the model. There is arguably a slightly stronger case for the presence of academic incompetence, because the relevant pathway (T1 academic attainment to T3 conduct problems) is significant, in the direction hypothesised (lower academic attainment is associated with a rise in conduct problems), and is of relatively large effect (-.107) in relation to the other pathways in the model. A similar pattern is shown between T1 academic attainment and T2 conduct problems, but to a lesser magnitude (-.073).

### \*\*\*FIGURE 3\*\*\*

In order to test for the effect of shared risk variables on the cascade effects identified in the model above, SEN and IDACI were regressed onto each factor, shown in Figure 3. Results showed a significant contribution of shared risk factors for the majority regressed pathways, across all time points. However, given the established associations of SEN and IDACI with both mental health (Green et al, 2005) and academic achievement (Department for Education, 2011), further significant pathways may have been expected. For instance, there is no significant pathway between SEN and T3 academic attainment. Similarly, associated effect sizes are relatively small, with only T1 shared risk pathways surpassing Cohen's effect of .1.

Regarding the effects of the previously identified pathways in Figure 2, there is an almost identical pattern of findings, with only minor changes to the academic pathways (T1 academic attainment to T2 conduct problems

reduced in strength, T1 academic attainment to emotional self-efficacy increased in strength). This provides partial support for hypothesis 3.

## Discussion

The current study sought to examine the development of children's conduct problems, and its association with academic attainment, in order to better understand the cumulative effects over time and interactions across developing systems. We integrated emotional self-efficacy into the developmental cascades model to examine emotional self-efficacy as a process that might explain the relationship between children's conduct problems and academic attainment. Disability and socio-economic status were also examined as shared risk factors. We also used a large, nationally representative dataset in the current study, enhancing the confidence by which results can be generalised to the wider school-based population. Three hypotheses were examined, consistent with developmental cascade theory, especially examination of evidence for adjustment erosion, academic incompetence, and shared risk. We examined adjustment fortification and hypothesized that early high levels of emotional self-efficacy will lead to enhanced academic attainment and reduced behaviour problems.

Consistent with *adjustment erosion* and *academic incompetence* models, there was some evidence to suggest that developmental cascade effects were in effect. Path models suggested that higher levels of conduct problems at age 11 (Time 1) were associated with poorer academic competence at age

407 13 (Time 3). In turn, poor academic competence at age 11 was related to  
408 higher levels of conduct problems at ages 12 and 13. Higher levels of conduct  
409 problems at age 11 were also linked to lower levels of emotional self-efficacy  
410 at age 12, which then predicted increased conduct problems at age 13. High  
411 levels of conduct problems around the time of entry to High school (age 11)  
412 were predictive of lower levels of emotional self-efficacy at age 12 and lower  
413 levels of academic attainment at age 13. Finally, the *shared risk* analyses  
414 suggested that socio-economic adversity and special educational need status  
415 played a small role in the link between early externalizing problems and  
416 academic competence in middle childhood. The current pattern of results  
417 support previous research, which showed path links from conduct (i.e.  
418 externalised) problems to academic incompetence in early to middle  
419 childhood (e.g. Campbell et al., 2006; Capaldi, 1992; Chen et al., 1997;  
420 Moilanen, Shaw, & Maxwell, 2010; Morgan et al., 2008). The inclusion of  
421 shared risk variables did little to alter the magnitude or statistical significance  
422 of any of the established pathways, suggesting that findings pertain to  
423 different groups of academic attainment, including those across a socio-  
424 economic spectrum and for those pupils identified with SEND. However,  
425 practical limitations prevent a more detailed investigation of these groups  
426 (SEND in particular), as the data were restricted to school-based provision.  
427 Therefore, in future work, there is an opportunity to examine whether the  
428 same patterns of effects can be found for those at the extremely high end of  
429 youth externalizing problems, and those with other clinical problems. It is  
430 noteworthy that all significant paths emerged after accounting for  
431 autoregressive effects of each domain, which were moderately high in

magnitude in all three domains of child adjustment. This is indicative of the comparatively short time scale of the measurements, in comparison to broader developmental cascade literature, which can span up to 20 years (e.g. Masten et al., 2005).

There was evidence to support the adjustment fortification model, with higher levels of emotional self-efficacy at T1 and T2 predicting lower levels of conduct problems at T2 and T3 respectively, and higher academic attainment at T3. These findings support previous work that shows poor emotional competence in adolescence predicts school difficulties associated with subsequent academic underachievement (e.g. school drop-out and persistent antisocial behaviour) (Gagnon, Craig, Tremblay, Zhou, & Vitaro, 1995; Haapasalo & Tremblay, 1994; Kochenderfer & Ladd, 1996; Petrides et al., 2004; Qualter et al., 2012; Vidal Rodeiro, Bell, & Emery, 2009). Our work extends those findings and is the first to highlight the importance of emotional self-efficacy in developmental cascades of conduct problems and academic achievement.

Those findings are in line with Bandura's theoretical model (1986, 1999, 2001) that argues that emotional self-efficacy is likely to influence whether adolescents think in an enabling way when considering social engagement and academic performance. It also affects how much effort adolescents will invest in a particular revision or social strategy, how they persevere in the face of social and academic difficulties, and how resilient they are to social and academic stressors. Our findings provide support for the idea that lower perceived emotional self-efficacy predicts higher levels of externalizing

problems and poor academic attainment. The finding that emotional self-efficacy influences the developmental sequence between conduct problems and academic attainment further supports the thesis that self-efficacies are an indicator of successful development during adolescents and intervention might be well suitable to the targeting of that domain.

### **Strengths, Limitations, and Future Study**

A particular strength of the current study is the use of a large community based sample that is representative of the general population. Also, contrasting previous studies, we used national standardized test scores as our measure of academic attainment at Time 1 and Time 3. These are relatively free from reporter bias when compared to concurrent adolescent self-reported attainment scores (Pataley, Deighton, Fonagy, & Wolpert, 2015). Additionally, the use of standardized test scores permits the results in a national context and supports future attempts at replication of our results.

Regarding limitations: First, the use of self-reported conduct problems by young people could not be avoided in the current study. While the 'gold standard' is to source multiple reporters (De Los Reyes, 2013), it was not practical in this large community based longitudinal studies. Second, the multi-level structure of the data (i.e. children clustered into schools) was not accounted for in the analysis because the group level sample size (41) was below minimal recommendations for analyses of this type (Hox & Maas, 2001). However, mental health outcomes typically feature very small inter-cluster correlations (typically around .02% (Hale et al., 2014)). Third, resultant model

fit was seen to be sub optimal. Although some explanation is likely to be attributable to sample size and the strength of the within-domain correlations, further consideration is required. Failure to capture idiosyncratic or even systemic exogenous variables may be accountable, though this is difficult to substantiate in the current design. We welcome further exploration in this field (both theoretical and empirical) to establish a more accurate representation of the apparent cascade effects.

Fourth, given the established paucity of the application of developmental cascade theory in the current context (i.e. psychosocial and academic measures within relatively short time period), there is a difficulty in establishing 'benchmark' figures for effect sizes. Available literature indicates effects are likely to be small. E.g. Deighton et al. (in press) report comparable effects, however as this study was also conducted over a two-year period, this may also be an artefact of the stability of the within domain correlations. A future direction therefore, is to consider capturing a longer time period, encapsulating more of a child's educational career.

Despite these limitations, the current paper is an early step in demonstrating the usefulness and contribution of developmental cascade theory for understanding the prospective associations between conduct problems, emotional self-efficacy, and academic attainment, and in establishing expectations for relative effects in the field.

This study represents a rigorous test of cascade effects of conduct problems, emotional self-efficacy, and academic attainment in early adolescence. In future cascade studies, it will be important to consider the developmental

506 timing of these effects. It is possible that there will be differences in the  
507 pattern of effects based on the developmental timing of these events. For  
508 example, in our sample, emotional self-efficacy contributed to how the  
509 adolescents transitioned into High School, but it may become more important  
510 during later stages of adolescents when adolescents will have to deal more  
511 with peer pressure and also manage the conflicting desire to engage with  
512 peers compared to revision. Thus, as peer relations become a more salient  
513 domain of social adjustment, the association between academic attainment  
514 and emotional self-efficacy is likely to become stronger. Further study is  
515 needed to examine changes in the patterns over time and how those can be  
516 accounted for by the changing social and academic environments.

## 518 **Conclusion**

520 The current study offers a valuable contribution to the emergent literature on  
521 developmental cascades examining self-efficacy, conduct problems, and  
522 academic attainment in an educational setting. Of particular note is the use of  
523 a large, representative sample of English adolescents, demonstrating an  
524 inclusiveness and rigour currently lacking in the field. Accordingly, new (but  
525 tentative) benchmarks are provided for future research.

- 527 Bandura, A. (1986). *Social Foundation of Thought and Action*. New Jersey:  
528 Prentice Hall.
- 529 Bandura, A. (1999). A social cognitive theory of personality. In L. Pervin & O.  
530 John (Eds.), *Handbook of Personality* (2nd ed., pp. 154–196). New York:  
531 Guilford.
- 532 Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual*  
533 *Review of Psychology*, 52, 1–26.
- 534 Belfer, M. L. (2008). Child and adolescent mental disorders: the magnitude of  
535 the problem across the globe. *Journal of Child Psychology and*  
536 *Psychiatry, and Allied Disciplines*, 49(3), 226–36. doi:10.1111/j.1469-  
537 7610.2007.01855.x
- 538 Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural*  
539 *Equation Approach*. Hoboken, NJ: Wiley and Sons.
- 540 Bornstein, M. H., Hahn, C.S., & Suwalsky, J. T. D. (2013a). Developmental  
541 pathways among adaptive functioning and externalizing and internalizing  
542 behavioral problems: Cascades from childhood into adolescence. *Applied*  
543 *Developmental Science*, 17, 76–87. doi:10.1080/10888691.2013.774875
- 544 Bornstein, M. H., Hahn, C.S., & Suwalsky, J. T. D. (2013b). Language and  
545 internalizing and externalizing behavioral adjustment: developmental  
546 pathways from childhood to adolescence. *Development and*  
547 *Psychopathology*, 25, 857–78. doi:10.1017/S0954579413000217



548 Bradley, R., & Corwyn, R. (2002). Socioeconomic status and child  
 549 development. *Annual Review of Psychology*, 53, 371-399.

550 Bronfenbrenner, U. (2005). *Making Human Beings Human: Bioecological*  
 551 *Perspectives on Human Development*. London: Sage Publications.

552 Chen, X., Huang, X., Chang, L., Wang, L., & Li, D. (2010). Aggression, social  
 553 competence, and academic achievement in Chinese children: a 5-year  
 554 longitudinal study. *Development and Psychopathology*, 22, 583–92.  
 555 doi:10.1017/S0954579410000295

556 Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155–159.

557 Davis-Kean, P, E. (2005). The influence of parent education and family  
 558 income on child achievement: The indirect role of parental expectations  
 559 and the home environment. *Journal of Family Psychology*, 12, 294-304.  
 560 <http://dx.doi.org/10.1037/0893-3200.19.2.294>

561 Deighton, J., et al. (under review). Longitudinal associations between  
 562 children's mental health difficulties and their academic performance: a  
 563 study of developmental cascades. *Development and Psychopathology*.

564 Department for Education. (2013). *Children with Special Educational Needs*  
 565 *2013: An analysis*. London: DfE.

566 Durlak, J., Weissberg, R., Dymicki, A., Taylor, R., & Schellinger, K. (2011).  
 567 The impact of enhancing students' social and emotional learning: A meta-  
 568 analysis of school-based universal interventions. *Child Development*, 82,  
 569 405–432.

- 570 Ek, E., Sovio, U., Remes, J., & Jarvelin, M. (2005). Social predictors of  
571 unsuccessful entrance into the labour market—A socialization process  
572 perspective. *Journal of Vocational Behaviour*, 66, 471-486. doi:  
573 10.1016/j.jvb.2004.02.002
- 574 Fredrickson, N. L., & Furnham, A. F. (2004). Peer-assessed behavioural  
575 characteristics and sociometric rejection: Differences between pupils who  
576 have moderate learning difficulties and their mainstream peers. *The*  
577 *British Journal of Educational Psychology*, 74, 391-410.
- 578 Frostad, P., & Pijl, S. J. (2007). Does being friendly help in making friends?  
579 The relation between the social position and social skills of pupils with  
580 special needs in mainstream education. *European Journal of Special*  
581 *Needs Education*, 22, 15-30.
- 582 Gagnon, C., Craig, W.M., Tremblay, R.E., Zhou, R.M., Vitaro, F. (1995).  
583 Kindergarten predictors of boys' stable behavior problems at the end of  
584 elementary school. *Journal of Abnormal Child Psychology*, 23, 751-66.
- 585 Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A  
586 research note. *Journal of Child Psychology and Psychiatry*, 38, 581-586.  
587 doi:10.1111/j.1469-7610.1997.tb01545.x
- 588 Goodman, R. (2001). Psychometric properties of the strengths and difficulties  
589 questionnaire. *Journal of the American Academy of Child and Adolescent*  
590 *Psychiatry*, 40, 1337-45. doi:10.1097/00004583-200111000-00015

- 591 Green, H., McGinnity, A., Meltzer, H., Ford, T., & Goodman, R. (2005). *Mental*  
 592 *Health of Children and Young People in Great Britain*. London: Office for  
 593 National Statistics.
- 594 Haapasalo, J., & Tremblay, R.E. (1994). Physically aggressive boys from  
 595 ages 6 to 12: family background, parenting behavior, and pre- diction of  
 596 delinquency. *Journal of Consulting and Clinical Psychology*, 62, 1044–52.
- 597 Hale, D. R., Pataly, P., Fitzgerald-Yau, N., Hargreaves, D. S., Bond, L.,  
 598 Görzig, A.,...Viner, R. M. (2014). School-level variation in health  
 599 outcomes in adolescence: Analysis of three longitudinal studies in  
 600 England. *Prevention Science*, 15, 600-610. doi: 10.1007/s11121-013-  
 601 0414-6.
- 602 Hampton, N, Z., & Mason, E. (2003). Learning Disabilities, Gender, Sources  
 603 of Efficacy, Self-Efficacy Beliefs, and Academic Achievement in High  
 604 School Students. *Journal of School Psychology*, 41, 101-112.  
 605 [doi:10.1016/S0022-4405\(03\)00028-1](https://doi.org/10.1016/S0022-4405(03)00028-1)
- 606 Hox, J., & Maas, C. (2001). The accuracy of multilevel structural equation  
 607 modelling with pseudobalanced groups and small samples. *Structrual*  
 608 *Equation Modelling*, 8, 157-174.
- 609 Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance  
 610 structure analysis: Conventional criteria versus new alternatives.  
 611 *Structural Equation Modelling*, 6, 1-55. doi: 10.1080/10705519909540118

- 612 Hubbard, R., & Lindsay, R. M. (2008). Why P values are not a useful measure  
613 of evidence in statistical significance testing. *Theory & Psychology*, 18,  
614 69–88. doi:10.1177/0959354307086923
- 615 Humphrey, N., & Ainscow, M. (2006). Transition club: Facilitating learning,  
616 participation and psychological adjustment during the transition to  
617 secondary school. *European Journal of Psychology of Education*, 21,  
618 319–331. doi:10.1007/BF03173419
- 619 Humphrey, N., Lendrum, A., & Wigelsworth, M. (2010). *Social and Emotional*  
620 *Aspects of Learning ( SEAL ) Programme in Secondary Schools :*  
621 *National Evaluation*. London: Department for Children, Schools and  
622 Families.
- 623 Johnston, C., & Gowers, S. (2005). Routine outcome measurement: A survey  
624 of UK child and adolescent mental health services. *Child and Adolescent*  
625 *Mental Health*, 10, 133–139. doi:10.1111/j.1475-3588.2005.00357.x
- 626 Kochenderfer, B. J., & Ladd, G. W. (1996). Peer victimization: Cause or  
627 consequence of school maladjustment? *Child Development*, 67, 1305–  
628 1317.
- 629 Kaukiainen, A., Salmivalli, C., Lagerspetz, K., Tammient, M., Vauras, M.,  
630 Mäki, H.,...et al. (2002). Learning difficulties, social intelligence, and self-  
631 concept: Connections to bully-victim problems. *Scandinavian Journal of*  
632 *Psychology*, 43, 269-278.

- 633 Lerner, R. M., & Castellino, D. R. (2002). Contemporary developmental theory  
634 and adolescence: developmental systems and applied developmental  
635 science. *Journal of Adolescent Health*, 31, 122–135. doi:10.1016/S1054-  
636 139X(02)00495-0
- 637 Lewin-Bizan, S., Bowers, E. P., & Lerner, R. M. (2010). One good thing leads  
638 to another: Cascades of positive youth development among American  
639 adolescents. *Development and Psychopathology*, 22, 759–70.  
640 doi:10.1017/S0954579410000441
- 641 Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development*  
642 *and Psychopathology*, 22, 491–5. doi:10.1017/S0954579410000222
- 643 Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradovic, J., Riley, J.  
644 R., ... Tellegen, A. (2005). Developmental cascades: Linking academic  
645 achievement and externalizing and internalizing symptoms over 20 years.  
646 *Developmental Psychology*, 41, 733–46. doi:10.1037/0012-  
647 1649.41.5.733
- 648 McCarty, C. A., Mason, W. A., Kosterman, R., Hawkins, J. D., Lengua, L. J., &  
649 McCauley, E. (2008). Adolescent school failure predicts later depression  
650 among girls. *The Journal of Adolescent Health : Official Publication of the*  
651 *Society for Adolescent Medicine*, 43, 180–7.  
652 doi:10.1016/j.jadohealth.2008.01.023
- 653 Moilanen, K. L., Shaw, D. S., & Maxwell, K. L. (2010). Developmental  
654 cascades: Externalizing, internalizing, and academic competence from

655 middle childhood to early adolescence. *Development and*  
656 *Psychopathology*, 22, 635–53. doi:10.1017/S0954579410000337

657 Monchy, M. D., Pijl, S. J., & Zandberg, T. (2004). Discrepancies in judging  
658 social inclusion and bullying of pupils with behaviour problems.  
659 *European Journal of Special Needs Education*, 19, 317-330.

660 Petrides, K. V., Furnham, A., & Mavroveli, S. (2007). Trait emotional  
661 intelligence: Moving forward in the field of EI. In Matthews, G., Zeidner,  
662 M., & Roberts, R. (Eds.), *The science of emotional intelligence: Knowns*  
663 *and unknowns* (pp. 151–166). USA: Open University Press.

664 Qualter, P., Dacre Pool, L., Gardner, K.J., Ashley-Kot, S., Wise, A., & Wols, A.  
665 (2015). The Emotional Self-Efficacy Scale: Adaptation and validation for  
666 young adolescents. *Journal of Psychoeducational Assessment*, 33, 33-  
667 45. doi: 10.1177/0734282914550383

668 Qualter, P., Gardner, K.J., Pope, D., Hutchinson, J.M., & Whiteley, H.E  
669 (2012). Ability emotional intelligence, trait emotional intelligence, and  
670 academic success in British secondary schools: A 5-year longitudinal  
671 study. *Learning and Individual Differences*, 22, 83-91. doi:  
672 10.1016/j.lindif.2011.11.007

673 Romano, E., Babchishin, L., Pagani, L. S., & Kohen, D. (2010). School  
674 readiness and later achievement: replication and extension using a  
675 nationwide Canadian survey. *Developmental Psychology*, 46, 995–1007.  
676 doi:10.1037/a0018880

677 Sklad, M., Diekstra, R., Ritter, M., & Ben, J. (2012). Effectiveness of school -  
678 based universal social, emotional, and behavioral programs: Do they  
679 enhance students' development in the area of skill, behavior,  
680 and adjustment? *Psychology in the Schools*, 49, 892 - 909.  
681 doi:10.1002/pits

682 Southampton Psychology Service. (2003). *Emotional Literacy: Assessment*  
683 *and Intervention*. London: NferNelson.

684 Tabachnick, B, G., & Fidell, L, S. (2013). *Using Multivariate Statistics*.  
685 Pearson: USA

686 Vaillancourt, T., Brittain, H. L., McDougall, P., & Duku, E. (2013). Longitudinal  
687 links between childhood peer victimization, internalizing and externalizing  
688 problems, and academic functioning: Developmental cascades. *Journal*  
689 *of Abnormal Child Psychology*, 41, 1203-1215. doi:10.1007/s10802-013-  
690 9781-5

691 ValÅs, H. (1999). 2. Students with learning disabilities and low-achieving  
692 students: Peer acceptance, loneliness, self-esteem, and depression.  
693 *Social Psychology of Education*, 3, 173-192.

694 Van Cleave, J., & Davis, M, M. (2006). Bullying and peer victimization among  
695 children with special health care needs. *Pediatrics*, 118, 1212–1219.

696 Vidal Rodeiro, C.L., Bell, J.F., & Emery, J.L. (2009). Can emotional and social  
697 abilities predict differences in attainment at secondary school?  
698 *Research Matters*, 7, 17-22.

699 Wigelsworth, M., Lendrum, A., Oldfield, J., Scott, A., Ten-Bokkel, I., Tate, K.,  
700 & Emery, C. (in press). The impact of trial stage, developer involvement  
701 and international transferability on universal social and emotional  
702 learning programme outcomes: A meta-analysis. *Cambridge Journal of*  
703 *Education*.

704 Footnote

705 <sup>1</sup> The Key Stages in the English education system are ages 5-7 (Key Stage 1), 7-11 (Key  
706 Stage 2), 11-14 (Key Stage 3), and 14-16 (Key Stage 4).